Disease: Viral Hemorrhagic Fevers*

*** Some of the viruses that causes the viral hemorrhagic fevers are possible bioterrorist agents.**
See "Special Considerations for Bioterrorism" beginning on page 4.

Clinical Features: The viral hemorrhagic fevers (VHR's) are a group of diseases which all present as an acute febrile illness with similar clinical presentations which may include; malaise, myalgias, headache, vomiting, diarrhea, flushing of the face and chest, petechial rash, purpura, mucous membrane bleeding, edema, hypotension, and shock.

Organism: The VHR's are caused by various RNA viruses from several viral families as follows: *Filoviridae* (Ebola and Marburg viruses); *Arenaviridae* (Lassa fever, Argentine HF, and Bolivian HF); *Bunyaviridae* (Korean HF of the hantavirus genus, Rift Valley fever, and Crimean-Congo HF); and *Flaviviridae* (Yellow fever and Dengue fever). There are no identified reservoirs for any of these organisms in the continental U.S. or Canada with the exception of Dengue fever virus in areas along the Mexican border, and a newly identified arenavirus in California.

Laboratory Test(s): Serum for specific antibody detection can be done on various of the VHR's. KDHEL does not provide testing for the VHR's.

Treatment: Treatment is primarily supportive and commonly requires intensive hemodynamic, hematologic, and respiratory supportive care. Ribavirin may be useful and available as an investigational drug for Lassa fever, Korean HF, Rift Valley fever, and Crimean-Congo HF.

Incubation Period: 1 to 12 days

Mode of Transmission: Most of these organisms are transmitted to humans directly from certain animals (usually monkeys), from wild or domestic mammalian reservoirs by tick or insect (mosquitoes or flies) bites, or by respiratory exposure to aerosolized rodent excreta. Nosocomial transmission is documented secondary to parenteral or mucous membrane exposure to blood or secretions of infected patients. Nosocomial aerosol/respiratory transmission is strongly suspected with Marburg, Ebola, Lassa, and Crimean-Congo HF. Theoretically, most of these viruses could be weaponized and delivered to intended victims by aerosol dissemination and infection by the respiratory portal of entry.

Period of Communicability: Patients are potentially communicable in the hospital setting as long as they are febrile. Corpses should also be considered communicable.

Susceptibility: Susceptibility is general. Lasting immunity is conferred by recovery from infection with most VHF viruses; however, life-long immunity has not been documented in all cases.

Occurrence: Most of the VHF viruses are indigenous to specific parts of the world where natural reservoirs exist, especially South America, Africa, Eastern Europe and Asia.

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Outbreak criteria: With the exception of Dengue fever in the Mexican border region, any case of a VHF in the U.S. is a highly unusual event and must be investigated vigorously (see below).

Surveillance Case Definition: With the exceptions of Yellow fever and Dengue fever (see *Case Definitions for Infectious Conditions* - Appendix X), there are no surveillance case definitions for the VHF's. Final diagnosis would be made by an infectious disease clinical specialist on the basis of clinical and laboratory evidence.

Clinical criteria: See "Clinical Features" above.

Laboratory criteria: Specific viral serological techniques, such as PCR, ELISA, CF, IFA, or specific IgM may be available variably for the different viruses.

Definition of a contact: Anyone with parenteral or mucous membrane exposure to the blood or secretions of a case of any of the VHF's. Anyone with respiratory exposure to a case of Marburg, Ebola, Lassa, and Crimean-Congo HF.

Case Investigation: The primary focus is to promptly determine if the case has recently traveled to a region of the world where the VHF viruses are indigenous or if the individual works in a laboratory where the viruses are being studied.

Methods of Control: The only VHF for which a vaccine is available is Yellow fever. Preventative measures are focused on controlling the reservoir, limiting human contact with the reservoir, or controlling vectors (see *CCDM* by Chin). Control measures are focused on patient care settings (see below).

Isolation: Patients should be in isolation with strict adherence to barrier nursing practices including the use of gowns, gloves, and masks and adherence to needle precautions. Contaminated surfaces and articles should be disinfected with hypochlorite or phenolic disinfectants. If either Marburg, Ebola, Lassa, or Crimean-Congo HF is suspected, strict respiratory isolation should also be observed including the use of negative pressure, and anteroom for changing protective barriers, and HEPA respirators.

Quarantine: Quarantine measures are unlikely to be necessary.

Follow-up:

Cases: None

Contacts: Health care providers or others with parenteral or mucous membrane exposure to blood or secretions of a case should be observed for symptoms.

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Reporting Requirements:

1. Report immediately by telephone to 1-877-427-7317.

2. Complete Kansas Notifiable Disease Form or enter into HAWK.

3. FAX form(s) to: 1-877-427-7318, or

4. Mail form(s) to: Epidemiologic Services Section - KDHE
   Landon State Office Building, Room 1051S
   900 SW Jackson Street
   Topeka, KS 66612-1290

5. An isolate of this organism is not required to be sent to the KDHE Division of Health and Environmental Laboratories.

6. For technical assistance questions, call 1-877-427-7317.

Special Considerations for Bioterrorism:

Identification and Reporting:

With the exception of Dengue fever in the Mexican border region, any case of a VHF in the U.S. is a highly unusual event and must be investigated vigorously. Every effort should be made to promptly determine if the case has recently traveled to a region of the world where the VHF viruses are indigenous or if the individual works with any of the viruses in a laboratory setting. If not, extraordinary etiologies, including bioterrorism, must be considered.

The following contact numbers are staffed 24 hours a day, 365 days a year. Contact in order of priority as shown.

1. Kansas State Epidemiologist: 785-249-8903

2. KDHE Epidemiologist On-Call: 1-877-427-7317

3. CDC Bioterrorism response coordinator hotline: 404-639-0385

Likely Bioterrorist Scenarios:

A VHF virus could be delivered to intended victims as an aerosol cloud, by means of a small or large spray device or by means of ventilation systems. Bacteria-laden micro-droplets could then be inhaled to cause infection.

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Safety Considerations for Public Health and Other Health Care Professionals:

See "Isolation" above.

Event Response/Control Measures:

Whether a bioterrorist event is announced or unannounced, local public health officials should play a central role in the event response and in the determination of appropriate control measures.

Definition of the population-at-risk:

This will be crucial task in such a situation, and will be essential to guide response activities. Public health authorities will play the lead role in this effort, but will consult with law enforcement, emergency response and other professionals in the process. The definition of the population-at-risk may have to be re-evaluated and redefined at various steps in the investigation of, assessment of, and response to a bioterrorist event.

Once a mechanism and scope of delivery have been postulated, asymptomatic potentially exposed individuals can be identified and observed.

Control measures which should be addressed are:

Decontamination: In patient care settings, contaminated surfaces and articles should be disinfected by used of hypochlorite or phenolic disinfectants, autoclaving, washing in hot cycles or other appropriate means. Infectious corpses should be handled minimally by being sealed in leak-proof material and buried or cremated promptly.

Post-exposure prophylaxis: Not available.

Isolation: Patients should be in isolation with strict adherence to barrier nursing practices including the use of gowns, gloves, and masks and adherence to needle precautions. If either Marburg, Ebola, Lassa, or Crimean-Congo HF is suspected, strict respiratory isolation should also be observed including the use of negative pressure, and anteroom for changing protective barriers, and HEPA respirators.

Quarantine: Quarantine measures are unlikely to be necessary. However, in large scale outbreaks, targeted quarantine measures may be necessary to limit the movement of exposed individuals.

Continued

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Event Response/Control Measures (cont.):

Other public health activities:

Line lists: A central responsibility of the LHD staff is to maintain detailed line lists of cases, suspect cases, and contacts with accurate identifying and locating information as well as appropriate epidemiological information. These lists will be essential for effective enforcement of isolation and quarantine measures, and for early identification of infection among contacts.

Pharmaceuticals:

In the event of an outbreak of a VHF, appropriate pharmaceuticals will be procured from the CDC National Pharmaceutical Stockpile Program. Procurement, storage, and distribution will be coordinated through the Kansas Department of Health and Environment.

Use of pharmaceuticals: Local and state public health officials must play a central role in determining which public health workers, health care workers, law-enforcement workers, emergency workers, and other essential personnel should have priority in receipt of limited pharmaceuticals.